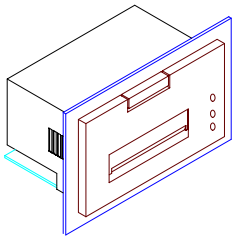
TP UP-AT

Panel Printer User Manual



The contents of this manual include how to use and operate the UP-AT printer. Please read this manual carefully before you use the printer then operate the printer step by step as the manual describes.

The section with the symbol in common use is the notice. The section in the pane is most important; you should pay attention to it.

Introduction About Each Chapter

Chapter 1: unpacking, assemble, and test the printer.

Chapter 2 how to operation the printer

Chapter 3 introduces the control commands.

Other chapters include the troubleshooting, function select, maintenance, and appendix in the end.

The contents of this manual are subject to change without notice.

! Never connect to the AC 220V power supply !

The symbol in common use in this book

Warning, must do follow it or will cause damage.

Caution, must do carefully insure the printer work properly

Note, give you important and useful message

Contents

Brief introduction·····4

Chapter 1 Installation·····5

Chapter 2 Operation·····18

Chapter 3 Printing control commands·····23

Chapter 4 Daily maintenance·····43

Chapter 5 Specifications·····45

Chapter 6 Parts list·····47

Appendix 1 The valid character codes·····48

Appendix 2 Printing command codes·····50

Appendix 3 TP μ P16 and TP μ P-40 printing command codes·····52

Brief introduction

TPUP-AT is a new type panel-mounting impact dot matrix printer.

The special features of this printer are small in size, light in weight, easy to operate and connect. It has high quality and beautiful appearance. It can be used in wide range of applications particularly it is very easy to mount on the instrument panel and make it one integrated mass.

Characteristics:

UP-AT has the following features beside the features high quality and easy to operate.

- It has mechanism for easy paper loading.
- Easy to cut paper with the new type metal cutter.
- Paper end detect.
- Built-in level 1 & 2 (GB 2312—1980) Chinese character fonts.
- Can use low level signal to initialize the printer
- Power supply adapter DC5V/2.0A(average)。
- It is compatible with the TPUP-A panel-mounting mini printer.

Chapter 1 Installation

Unpacking·····6

Install the printer·····7

Install the ribbon cassette·····11

Loading paper·····13

Test the printer·····15

Connect to the computer·····16

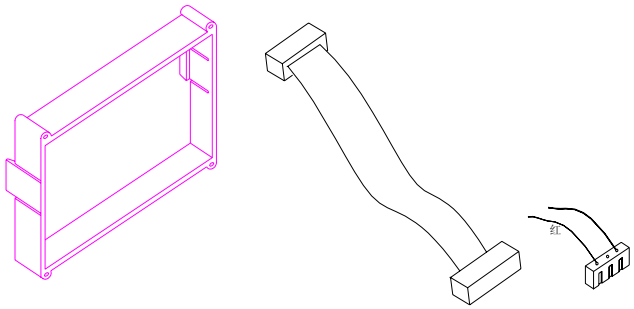
Unpacking

Checking the parts

Make sure no parts are missing or damaged when you unpack the box.

Parts list：

1. Connected cable
2. Fastness frame
3. Screws (Φ3×25mm, four)
4. Manual
5. Power supply line
6. Paper scroll



Fastness frame　　cable　　power supply line

Figure 1

Install the printer

Install the printer to the proper position

Before you install the printer you should consider the following:

- Set the printer near the control machine so that the cable can connect properly.
- The thickness of the installation panel should be in the range 1.0~10.0mm. Too thick or too thin will cause ricketiness.
- Make room for examine and repair the printer.
- Don't put it in the sun or in the place too hot, moist or dusty.
- Don't connect the printer, computer system with other high-power machine in the same circuit.
- Make sure the printer apart from the interferential source.

It is a preferable installation; sketch map is shown as bellow.

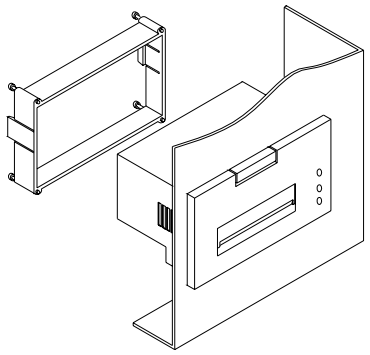


Figure 2

Confirm the installation size

TPUP-AT printer overall dimension is show as below: in order to install the printer in the vertical panel of the machine, according to the configuration Figure 3, it is needed to open a hole on vertical panel on the apparatus or devices.

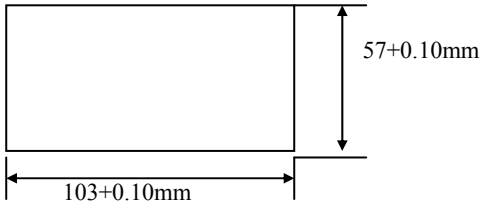


Figure 3

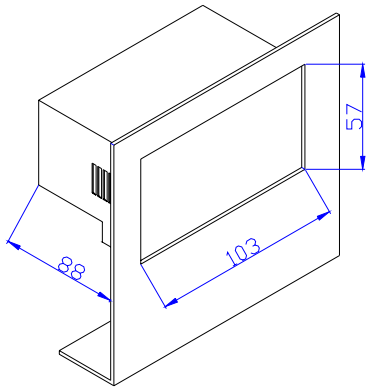


Figure 4

Installation method

Insert the printer to the hole in front of panel, put fastness frame on the printer from the back of it, then screw down the screws.

Considering the installation panel, we recommend you use the metal panel thickness should be in the range 1.0~2.0mm, plastic panel thickness should be in the range 2.0~10.0mm. Too thick or too thin will cause ricketiness.

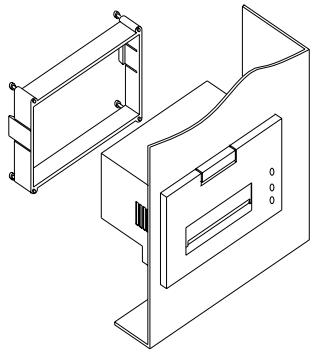


Figure 5

Install the printer as the cutline

Connect to the power supply

The power supply voltage of the TPUP-AT should be in the range 5V±0.25V DC, the current is about 2.0A.

TPUP-AT provides a power supply line with polarity protection mechanism. It can connect directly to the TPUP-AT J5 jack in the printer control board. The power supply line has two lines, the red one should connect to the positive(＋) polarity, the white one should connect to the negative(－) polarity

!	Don't connect to the wrong polarity. The voltage of the power supply must be in the permissive range. Or the permanent damage will occur.

Install the ribbon cassette

The printer has a ribbon cassette loaded at ex-factory but cassette needs to replace since it has been used for a period of time. If you prepare to replace the cassette, you can do as the following steps:

1. Make sure power off the printer.
2. Unlock the frontal cover and open it.
3. Push the button on the top right corner to release the mechanism head.

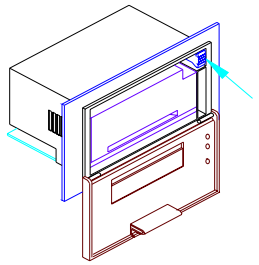


Figure 6

4. Lift the left end of the ribbon cassette (narrow end), then lift the right end and take out the cassette.

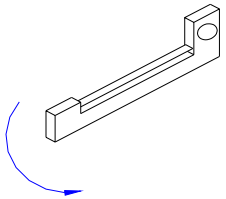


Figure 7

Put the left end of the new cassette slightly on the axle. Meanwhile, keep the left end little higher than the left.

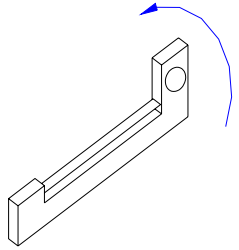


Figure 8

If find the right end has not fallen to the axle completely, please press the knob of the cassette and make it slowly turned clockwise as shown by the arrow. You can press down the left end of the cassette only after lay the right end down to the axle deep enough. Now check the ribbon if or not it is tight and keeps on the inside of the cassette. Turn the knob clockwise again when find the ribbon on the outside of the cassette.

5. Push back the mechanism head and lock it.

6. Finally close the cover of the printer.

Please replace the ribbon as the steps described above.

Loading paper

The steps of loading paper is described as follows:

1. Unlock the frontal cover and open it.
2. Push the button on the top right corner to release the mechanism head.
3. Lift the mechanism slightly.

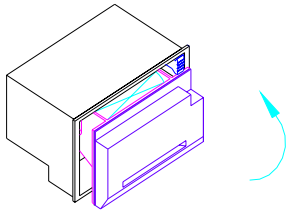


Figure 9

4. Take out the paper scroll
5. Put the new paper scroll to the paper roller then insert it by the direction shown as figure 10 to the track.
6. Connect to the power supply.
7. Push the SEL button，let the printer in offline state, SEL indicator is off.
8. Push button LF, let the printer into feeding paper state.

9. Put the paper edge to the entry; let it enter the mechanism head.
10. Let the paper come on from the paper exit on the top of printing mechanism. Push the button SEL to stop feeding.
11. Lay down the mechanism head.
12. Push back the mechanism head to the position shown by the label affixed to the mechanism head, and then lock the mechanism head.
13. Close the frontal cover.

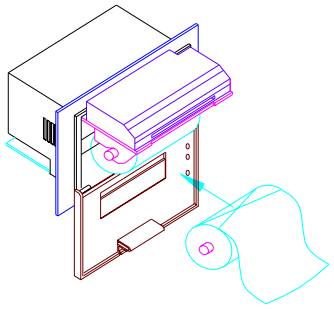


图 十

	Please loading paper as the steps described above
	Make sure push the mechanism back to the exact position shown by the label.

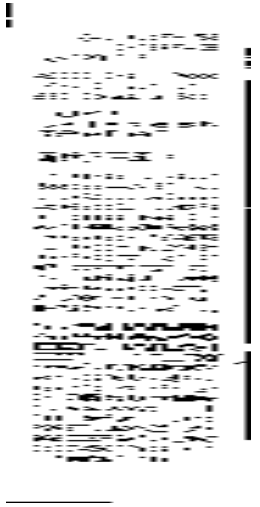
Test the printer

After install the printer completely, you should use the self-test function to check the printer before you use it.

Self-test method:

In the state that the printer has connect with the power supply, if the indicator is green, push button SEL，turn off the light, push button LF then push button SEL immediately, the printer will enter self test mode.

Self-test will print out all the valid characters in the character sets. The self-test list is shown as bellow:



If the self-test list is incorrect it need to check the printer and confirm the power supply is specified or not.

Connect to the computer

Parallel interface

The steps connect to the computer is described as bellow:

1、 Make sure you have turned off the printer and the computer.

2、 Connect the printer to the J4 jack in the printer control board with the 26-pin interface cable.

3、 Then connect the cable to the computer.

The pin assignment of the parallel port is shown in Table as bellow:

Computer 25 pin plug		Direction	UP-AT		Description
1	Strobe pulse	-->	1	Strobe pulse	
2	Data bit 0	-->	3	Data bit 0	
3	Data bit 1	-->	5	Data bit 1	
4	Data bit 2	-->	7	Data bit 2	
5	Data bit 3	-->	9	Data bit 3	
6	Data bit 4	-->	11	Data bit 4	
7	Data bit5	-->	13	Data bit 5	
8	Data bit6	-->	15	Data bit 6	
9	Data bit7	-->	17	Data bit 7	
10	To confirm	<--	19	Confirmed pulse	
11	Busy	<--	21	Busy	High level indicate Busy
12	No paper	<--	23	No paper	High level indicate no paper
13	To select	<--	25	To select	Pull up to HIGH level indicate online
14		NC			

15	Error	<--	4	Error	Pull up to HIGH level indicate on error
16	Initialize the printer	-->	6	Initialize the printer	Low level indicate initialize the printer
17		NC			
18	Ground	---	10	Ground	
19	Ground	---	12	Ground	
20	Ground	---	14	Ground	
21	Ground	---	16	Ground	
22	Ground	---	18	Ground	
23	Ground	---	20	Ground	
24	Ground	---	22	Ground	
25	Ground	---	24	Ground	

Timing chart for the parallel connection is as figure 11

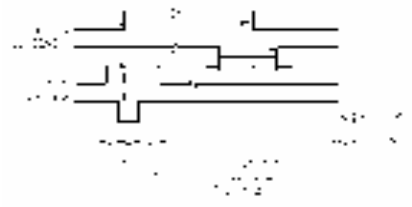


Figure 11

Chapter 2 Operation

Panel operation·····19

JUMP functions·····20

Initialize the printer·····21

Select the character set·····21

User-defined characters·····21

Select the commands·····22

Select printing direction·····22

Select Chinese characters printing mode·····22

Select the Chinese character font·····22

Panel operation

Indicator and buttons

The panel of TPUP-AT has an indicator and two buttons respectively mark with SWL, LF.

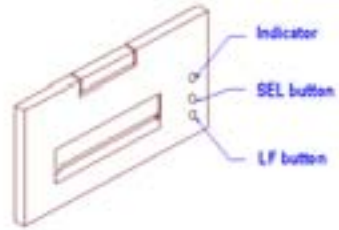


Figure 12

1．Indicator

- When the indicator turn red indicates printer is offline with no paper or printer detect the black mark.
- Indicator turn green indicates printer is online.
- When the indicator turn orange indicates the printer is online with no paper.
- Indicator turn off indicates the printer is offline or printer is busy.

2．Button SEL

1) Online offline state

- The printer enters online state automatically after connect to the power supply or exit the self-test mode. The indicator turn green.
- Push the button SEL, the indicator turn off, the printer go into the offline state.
- Push the button SEL again, the indicator turn green, printer is online again.

Notice：The printer will not receipt the data when it is offline.

2) How to pause when printer is printing.

Push the button SEL when the printer is printing, the printer will pause and enter the offline mode after it print the previous row. The printer will continual to print the rest when push the button SEL again.

3) Enter the HEX-DUMP mode

Keep pushing the button SEL, then connect the printer to the power supply, the printer will enter the HEX-DUMP mode.

3．Button LF

When the printer is offline, push the button LF, the printer will feed paper. Push button LF again the printer will stop feeding.

4．Self-test mode

After connect to the power supply, if the indicator is green push the button SEL to turn off it. Push button LF then push button SEL immediately, the printer will enter the self-test mode.

Exit the self-test mode:

1）、After print out the self-test list completely the printer will exit the self-test mode automatically.

2）、Push button SEL the printer will exit the self-test mode when printer printing the self-test list.

JUMP functions

UP-AT has four JUMP, they mark respectively with J1, J2, J3, J7, and you can realize some functions by setting them.

JUMP icon	JUMP state	Function
J1	Not insert the short circuit piece	Select ESC commands
	Insert the short circuit piece	Select UP commands
J2	Not insert the short circuit piece	Select ASCII characters printing mode
	Insert the short circuit piece	Select Chinese characters printing mode
J3	Not insert the short circuit piece	Select printing by the contrary direction
	Insert the short circuit piece	Select printing by the normal direction
J7	Insert the short circuit piece between PIN1 and PIN2	Select the 12×12 Chinese character font
	Insert the short circuit piece between PIN2 and PIN3	Select the 15×16 Chinese character font

（Explanation: PIN1 of J7 is near the white cirque，the functions explanation of JUMP you can refer to the specified chapter in this manual.）

Initialize the printer

The contents of initialization including:

Select the default value of the command codes including: 1 line space 3 dot lines.2. Page length 40 character lines. 3.Original length. 4. The vertical table and horizontal table values are 0.5. The left width and right width are limited within 0.6. The multiple of the characters and graphics will be zoomed in is 1.

Four methods initialize the printer:

1. Make use of the software. Send the command ESC@ to the printer from the computer realize the initialization.
2．Realize the initialization by self-test.
3．Connect to the power supply to initialize the printer.
4．Initialize the printer by the initialization cable of the parallel interface.

Select the character set

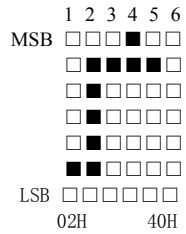
There are two character sets built in the TPUP-AT. Character set 1 will be selected after the printer is initialized or connect to the power supply. Character set 2 will be selected after the printer receives the command ESC 7.

The character codes of character set 1 and character set 2 you can refer to the appendix 1.

User-defined characters

Characters compose of the 6×8 dot matrix. Per column make up of one byte

data. The highest bit is on the top. Shown as the illustration.



User defined characters save in the RAM, it will vanish after disconnect to the power supply.

Select the commands

TP UP-AT16P and TP UP-AT40P both provide the ESC commands and compatible commands. You can choose the commands by setting the J1. Insert the short circuit piece select the compatible commands, or the ESC commands will be selected. The ESC commands had been selected at ex-factory. Refer to the appendix 2.

As the TP UP-AT24, it just has the ESC commands.

Select printing direction

TP UP-AT16P and TP UP-AT40P both have two printing directions. You can select the printing direction by setting the J3. Insert the short circuit piece select the normal printing direction or the contrary direction will be selected.

Select Chinese characters printing mode

TP UP-AT16P and TP UP-AT40P both have two characters printing modes, one is the ASCII characters printing mode the other is the Chinese characters printing mode. You can select the characters printing mode by setting the J2. Insert the short circuit piece select the Chinese characters printing mode or the ASCII characters printing mode will be selected. The ASCII characters printing mode had been selected at ex-factory.

Select the Chinese character font

TP UP-AT16P and TP UP-AT40P both have two Chinese character fonts. The

one is 12×12 dot matrix the other is 15×16 dot matrix. You can select the Chinese character font by setting J7.It will select the 12×12 dot matrix font by short circuit the PIN1 and PIN2. It will select the 15×16 dot matrix font by short circuit the PIN2 and PIN3.

Chapter 3 Printing Control Commands

Summary

TP UP-AT panel-mounted impact dot matrix printer provides 40 kinds of printing control commands. The commands provide the functions described as following:

(1) Defining the format
(2) Enlarge character printing
(3) Printing dot matrix graphics
(4) Selecting character set
(5) User-defined characters
(6) Printing Chinese
(7) Others

Printing control commands includes: byte control commands、ESC control commands、FS control commands. ESC control commands begin with the codes ESC and there is other codes follow ESC. FS control commands begin with the codes FS and there is other codes follow FS.

TP UP-AT control commands were designed base on the IBM and EPSON printers. So the control commands are compatible with most other printers.

The format of each printing commands is illustrated below:

Printing Command

Format:	ASCII	:	the sequence in standard ASCII characters
	Decimal	:	the sequence in decimal numbers
	Hexadecimal	:	the sequence in hexadecimal numbers

Explanation: description of the command.
Example: Some examples are listed to illustrate the command for better understanding.

Paper Feeding Commands

LF — Print and Line Feed

Format:	ASCII	:	LF
	Decimal	:	10
	Hexadecimal	:	0A

Explanation:

Print data of current line in buffer and feed one line. Only feed one line if data buffer is empty.

ESC J — Print and 'n' dot lines feed

Format:	ASCII	:	ESC	J	n
	Decimal	:	27	74	n
	Hexadecimal	:	1B	4A	n

Explanation:

Print and line feed n dot lines forward. The value of n is 1～255.

Print the data of buffer if it exists. The printer will print the data then feed the paper.

If the buffer is empty, the printer will feed one character line then feed n dot lines.

The line spacing may be changed after use enlarging character command ESC V or ESC W.

ESC 1 — Set 'n' dot lines spacing

Format:	ASCII	:	ESC	1	n
	Decimal	:	27	49	n
	Hexadecimal	:	1B	31	n

Explanation:

Set n dot lines spacing for future Line Feed command.

The value of n ranges between 0 and 255. Usually set n=0 before using ESC K command to print bit-map graphics. Normally set n=3 at text printing mode. Default value is n=3.

Example:

Observe the effect of the command by following BASIC program:

```
10 FOR I=1 TO 11 STEP 2
20 LPRINT CHR$(27);"1";CHR$(I);          'ESC 1, set line spacing.
30 LPRINT "LINE SPACING";CHR$(10);       'Print string and Carriage Return.
40 NEXT I
```

A printout of above program on TP AT is below:

```
LINE SPACING
LINE SPACING
LINE SPACING
LINE SPACING
LINE SPACING
LINE SPACING
```

FF — Form Feed

Format:	ASCII	:	FF

	Decimal	:	12	
	Hexadecimal	:	0C	

Explanation:

Feed paper to the beginning side of next page.

Formatting Commands

ESC C — Set page length

Format:	ASCII	:	ESC	C	n
	Decimal	:	27	67	n
	Hexadecimal	:	1B	43	n

Explanation:

Set page length with n character lines. The value of n should be in the range 0～255. The page length will be defined as 256 lines if n=0.

The default value is n=40.

ESC N — Set bottom margin

Format:	ASCII	:	ESC	N	n
	Decimal	:	27	78	n
	Hexadecimal	:	1B	4E	n

Explanation:

Set bottom margin into n lines. The value of n should be in 0 - 255. The default value is n=0.

The bottom margin means the numbers of space lines from the last printable line on one page to the first printable line of next page.

For instance, if set bottom margin is 3 lines then issue the following code sequence:

	ASCII	:	ESC	N	ETX
	Decimal	:	27	78	3
	Hexadecimal	:	1B	4E	03

The BASIC program sending above code sequence is below:

```
PRINT CHR$(27);"N";CHR$(3);
```

ESC O — Cancel bottom margin

Format:	ASCII	:	ESC	O
	Decimal	:	27	79
	Hexadecimal	:	1B	4F

Explanation:

Set bottom margin to 0 line. It means that printer will prints one by one line without space lines between two continual pages.

ESC B — Set vertical tabs

Format:	ASCII	:	ESC	B	n1	n2	n3	...	NUL
	Decimal	:	27	66	n1	n2	n3	...	0
	Hexadecimal	:	1B	42	n1	n2	n3	...	00

Explanation:

The vertical tab position is defined as n1, n2 and etc. All its values must be limited to the range of page length set by ESC C command.

The character NUL added at last indicates the end of the command.

All the vertical tab position can be canceled by ESC B NUL command.

VT command executes the vertical tab and feed paper to the position of next vertical tab.

For example: set three positions of vertical tab separately in line 2, 5 and 8. You can send following command.

	ASCII	:	ESC	B	STX	ENQ	BS	NUL
	Decimal	:	27	66	2	5	8	0
	Hexadecimal	:	1B	42	02	05	08	00

Its BASIC program is:

```
10 LPRINT CHR$(27);"B";CHR$(2);CHR$(5);CHR$(8);CHR$(0);'ESC B command
20 LPRINT CHR$(11);                                     'VT command
30 LPRINT "VTAB1";                                      'Print string
40 LPRINT CHR$(11);                                     'VT command
50 LPRINT "VTAB2";                                      'Print string
60 LPRINT CHR$(11);                                     'VT command
70 LPRINT "VTAB3";                                      'print string
```

The printout running this program in TP UP-AT is as follows:

```
VTAB3

VTAB2

VTAB1
```

VT — Vertical tab

Format:	ASCII	:	VT
	Decimal	:	11
	Hexadecimal	:	0B

Explanation:

Feed paper to the position of the next vertical tab set by ESC B.

Note: if no vertical tab setting before or the current position equals or exceeds the last position of vertical tab, VT command only feeds paper one line (same as LF command).

ESC D — Set horizontal tabs

Format:									
	ASCII	:	ESC	D	n1	n2	n3	...	NUL
	Decimal	:	27	68	n1	n2	n3	...	0
	Hexadecimal	:	1B	44	n1	n2	n3	...	00

Explanation:

The horizontal tab position is defined as n1,n2 and etc. All its values must be limited to the range of printing width based on the model of printer (refer to chapter 5).

The character NUL added at last indicates the end of this command.

All the setting base on ESC D can be cancel by the form ESC D NUL of this command.

HT command executes the horizontal tab.

For example: set three positions of horizontal tab separately in column 2, 9 and 14. You can send following command.

	ASCII	:	ESC	D	STS	HT	SO	NUL
	Decimal	:	27	68	2	9	14	0
	Hexadecimal	:	1B	44	02	09	0E	00

Its BASIC program is:

```
10 LPRINT "1234567890123456"                                    'Scalar
20 LPRINT CHR$(27);"D";CHR$(2);CHR$(9);CHR$(14);CHR$(0);        'ESC D
command
30 LPRINT CHR$(9);                                              'HT
command
40 LPRINT "HT1";                                                'Print string
50 LPRINT CHR$(9);                                              'HT
command
60 LPRINT "HT2";                                                'Print
string
70 LPRINT CHR$(9);                                              'HT
command
80 LPRINT "HT3";                                                'Print string
```

The printout of running this program in TP UP-AT is as follows:

```
  HT1       HT2     HT3
1234567890123456
```

HT — Horizontal tab

Format:			
	ASCII	:	HT
	Decimal	:	9
	Hexadecimal	:	09

Explanation:

Feed paper to the position of the next vertical tab set by ESC D.

If no horizontal tab setting before or if the current position equals or exceeds the last position of horizontal tab. HT command will be no action.

ESC f — Print blank character or lines

Format:						
	ASCII	:	ESC	f	m	n
	Decimal	:	27	102	m	n
	Hexadecimal	:	1B	66	m	n

Explanation:

If m=0，ESC f NUL n command prints n blank characters. The value of n should be in the range of printing width specified by the model of printer. (refer to chapter 5).

If m=1, ESC f SOH n command prints n blank lines. The value of n should range among 0 and 255.

For instance: Print 6 blank characters in one line, you can send following command:

	ASCII	:	ESC	f	NUL	ACK
	Decimal	:	27	102	0	6
	Hexadecimal	:	1B	66	00	06

Another instance is printing 6 blank lines. You can send the follows:

	ASCII	:	ESC	f	SOH	ACK
	Decimal	:	27	102	1	6
	Hexadecimal	:	1B	66	01	06

ESC Q — Set right margin

Format:					
	ASCII	:	ESC	Q	n
	Decimal	:	27	81	n
	Hexadecimal	:	1B	51	n

Explanation:

The value of n should be in 0 to the range of printing width specified by the model of printer. (Seeing at chapter 5).

The default value is n=0, that is, no right margin.

The position is absolutely set by this command, so it is not affected by ESC U and ESC W character enlarge commands.

If reach to the right margin set by the command, printer would add Carriage Return and Line Feed automatically.

For example, to set right margin into 6,you can send following command

	ASCII	:	ESC	Q	ACK
	Decimal	:	27	81	6
	Hexadecimal	:	1B	51	06

The BASIC program for the above example is shown as follows:

```
10 LPRINT "123456789012345678901234"
20 LPRINT CHR$(27);"Q";CHR$(6);     'ESC Q command
30 LPRINT "12345678901234567890123456789012345678901234567890"
```

The printout of running the program in TP UP-AT printer is shown below:

7890
901234567890123456
123456789012345678
12345678901234567890123456789012345678901234

ESC l — Set left margin

Format:					
	ASCII	:	ESC	l	n
	Decimal	:	27	108	n
	Hexadecimal	:	1B	6C	n

Explanation:

The value of n should be in 0 to the range of printing width specified by the model of printer.

The default value is n=0, that is, no left margin.

The position is absolutely set by this command, so it is not affected by ESC U and ESC W character enlarge commands.

For instance, to set left margin into 6, you can send following command:

ASCII	:	ESC	l	ACK
Decimal	:	27	108	6
Hexadecimal	:	1B	6C	06

The BASIC program for the above example is shown below:

```
10 LPRINT "123456789012345678901234"                'Scalar
20 LPRINT CHR$(27);"l"; CHR$(6);                    'ESC l command
30 LPRINT "12345678901234567890123456789012345678901234567890"
```

The printout of running the program in TP UP-PN printer is shown below:

7890
901234567890123456
123456789012345678
12345678901234567890123456789012345678901234

Character Setting Commands

ESC U — Enlarge width

Format:					
	ASCII	:	ESC	U	n
	Decimal	:	27	85n	
	Hexadecimal	:	1B	55	n

Explanation:

The width of character or graphics will be n times wider than normal one. The value of n should range in 1 - 4. The default value is n=1, that is, normal width without enlarging.

For observing the enlarging effect of ESC U command, please run following BASIC program:

```
10 FOR I=1 TO 3                'From 1 to 3 times
20 LPRINT CHR$(27);"U";CHR$(I);       'ESC U command
30 LPRINT "TP";                'Print string
40 NEXT I
50 LPRINT CHR$(13);                'CR command
```

The printout of running the program in TP UP-AT printer is shown below:

Note: This command is active just after issuing ESC W SOH(n=1) command.

ESC V — Enlarge height

Format:					
	ASCII	:	ESC	V	n
	Decimal	:	27	86	n
	Hexadecimal	:	1B	56	n

Explanation:

The height of character or graphics will be n times higher than normal one. The value of n should range in 1 - 4. the default value is n=1, that is, normal height without enlarging.

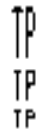
This command should issue at the beginning of a line.

For observing the enlarging effect, please use following BASIC program:

```
10 FOR I=1 TO 3                'From 1 to 3 times
20 LPRINT CHR$(27);"V";CHR$(I);       'ESC V command
```

```
30 LPRINT "TP"              'Print string
40 NEXT I
```

The printout of running the program in TP UP-AT printer is shown below:



Note: This command is active just after issuing ESC W SOH（n=1）command.

ESC W — Enlarge width & height

Format:					
	ASCII	:	ESC	W	n
	Decimal	:	27	87	n
	Hexadecimal	:	1B	57	n

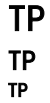
Explanation:

The printing width and height will be n times bigger than normal one. The value of n should range among 1 to 4. The default value is n=1, that is, normal width and height without enlarging.

For observing the enlarging effect of ESC W command, please run following BASIC program:

```
10 FOR I=1 TO 3                 'From 1 to 3 times
20 LPRINT CHR$(27);"W";CHR$(I);     'ESC W command
30 LPRINT   "TP"            'Print string
40 NEXT I
```

The printout of running the program in TP UP-AT printer is shown below:



ESC - — Turn underline on/off

Format:					
	ASCII	:	ESC	-	n
	Decimal	:	27	45	n
	Hexadecimal	:	1B	2D	n

Explanation:

Underline is turned on if n=1 and turned off if n=0.

All characters including blank ones are underscored except meet the command of turning off underline.

The BASIC program for observing the effect of ESC – command is shown below:

```
20 LPRINT "TP";
30 LPRINT CHR$(27);"-";CHR$(1);     'Turn underline on
40 LPRINT "UPT";            'UPAT prints underline
50 LPRINT CHR$(27);"-";CHR$(0);     'Turn underline off
60 LPRINT "TP"
```

The printout of running the program in TP UP-AT printer is shown below:

ESC + — Turn overscore on/off

Format:					
	ASCII	:	ESC	+	n
	Decimal	:	27	43	n
	Hexadecimal	:	1B	2B	n

Explanation:

Overscoring is turned on if n=1 and turned off if n=0.

All characters including blank ones are overscored .

The BASIC program for observing the effect of ESC + command is shown below:

```
20 LPRINT "TP";
30 LPRINT CHR$(27);" +";CHR$(1);            'Turn overscore on
40 LPRINT "UPT";            'UPAT prints overscore
50 LPRINT CHR$(27);" +";CHR$(0);    'Turn overscore off
60 LPRINT "TP"
```

The printout of running the program in TP UP-AT printer is shown below:

ESC 6 — Select Font 1

Format:				
	ASCII	:	ESC	6

	Decimal	:	27	54
	Hexadecimal	:	1B	36

Explanation:

All characters in use will be from Font 1 after issuing this command.

There are two sets of fonts available in TP UP-AT printers. Font 1 is selected when power on or ESC @ command is active.

ESC 7 — Select Font 2

Format:	ASCII	:	ESC	7
	Decimal	:	27	55
	Hexadecimal	:	1B	37

Explanation:

All characters in use will come from Font 2 after issuing this command. Refer to command ESC 6.

SO — Select double-width printing

Format:	ASCII	:	SO
	Decimal	:	14
	Hexadecimal	:	0E

Explanation:

All characters will be printed with double-width as normal one in the current line after issuing the command. Carriage Return or DC4 commands can terminate SO command.

However normal and width-enlarging characters can be mixed in the same line.

DC4 — Cancel double-width printing

Format:	ASCII	:	DC4
	Decimal	:	20
	Hexadecimal	:	14

Explanation:

Cancel the double-width printing in one line selected by SO command. This command does not cancel enlarging mode selected by ESC U and ESC W commands.

ESC I — Turn reverse printing on/off

Format:	ASCII	:	ESC	i	n
	Decimal	:	27	105	n
	Hexadecimal	:	1B	69	n

Explanation:

If n=1, then turn on the reverse printing. If n=0 turn off it. Reverse printing is white on black, as in a photographic negative.

Normal printing is black in white. It is selected when power on or issue ESC @ command.

The BASIC program for reverse printing is as follows:

```
10 LPRINT CHR$(27);"i";CHR$(1);     'Turn reverse printing on
20 LPRINT " ABCDEFGHIJKLMNO"
```

The printout of running the program in TP UP-AT printer is shown below:

ESC c — Turn inverse printing on/off

Format:	ASCII	:	ESC	c	n
	Decimal	:	27	99	n
	Hexadecimal	:	1B	63	n

Explanation:

If n=1, then turn inverse printing on. If n=0, turn it off. Reverse printing is usual in wall-mounted printer, so that the printout is easy to read. The default is n=1.

User-Defined Character Commands

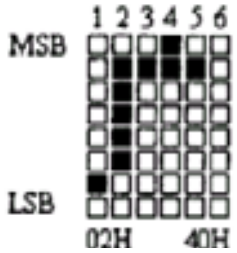
ESC & — Define user-defined character

Format:	ASCII	:	ESC	&	m	n1	n2	...	n6
	Decimal	:	27	38	m	n1	n2	...	n6
	Hexadecimal	:	1B	26	m	n1	n2	...	n6

Explanation:

The command allows user to define a user-defined character. The parameter m is the code of this character. The value of the code ranges among 32 and 255.

Parameter n1, n2, … , n6 are the structure code of the character. The character is composed of 6X8 dot matrix, that is, 6 dot-columns by 8 dot lines. One byte of the data corresponds to one column of the character. The MSB of the byte is at top of the column. Refer to following structure:



User-defined characters are stored in RAM but they will be lost when power off.

If several ESC & commands used the identical value of the m only the last m would be available. The number of the user-defined character is able up to 32. Please refer to ESC % and ESC : commands.

ESC % — Replace with user-defined character

Format:	ASCII	:	ESC	%	m1	n1	m2	n2	...
	mk	nk	NUL						
	Decimal	:	27	37	m1	n1	m2	n2	...
	mk	nk	0						
	Hexadecimal	:	1B	25	m1	n1	m2	n2	...
	mk	nk	00						

Explanation:

This command can replace the character n of current fonts with user-defined character m. the user-defined character m will be printed after issuing the command, which is substitute for the character n in current fonts.

m1,m2,…,mk are codes of user-defined character.

n1,n2…,nk are codes of characters in current fonts and will be replaced.

Value for both m and n ranges among 32 and 255.

The value of subscript κ ranges among 1 and 32. the maximum number of characters that can be replaced is 32.

The character NUL adds in the last to indicate the end of the command.

Please refer to ESC & and& ESC : commands.

ESC : — Restore the font character

Format:	ASCII	:	ESC	:
	Decimal	:	27	58
	Hexadecimal	:	1B	3A

Explanation:

The command restores the original character of Font, which has been replaced with the user-defined character set by ESC % command. However the user-defined character is still in RAM and can be called back by the ESC % command.

Using the following BASIC program can observe the effect of ESC &, ESC % and ESC : commands.

```
10 LPRINT CHR$(27);"W";CHR$(2);                 'Enlarge in V and H
20 LPRINT CHR$(27);"&";CHR$(65);                'ESC & command
30 LPRINT CHR$(&H02)CHR$(&H7C)CHR$(&H40);
40 LPRINT CHR$(&HC0)CHR$(&H40)CHR$(&H00);
50 LPRINT CHR$(27);"%";CHR$(65)CHR$(65)CHR$(0); 'ESC % command
60 LPRINT CHR$(65)                      'Print defined character
70 LPRINT CHR$(27);":";                 'ESC :command
80 LPRINT CHR$(65)                      'Restore the font character
```

The printout of running the program in TP UP-PN printer is shown below:

Graphics commands

ESC K — Bit map printing

Format:	ASCII	:	ESC K n1 n2… data…
	Decimal	:	27 75 n1 n2…data…
	Hexadecimal	:	1B 4B n1 n2… data…

Explanation:

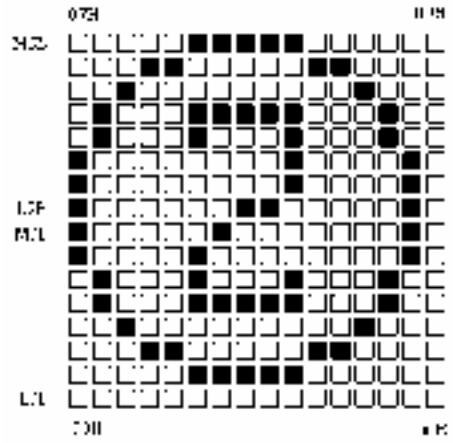
The value n1 and n2 form a 16-bit number W with n1 as the low byte and n2 as the high byte. This number W represents the width of a graphic. W should be in the range 1 to the maximum number of dots per line which varies with the model of printer used. This command prints graphics with W X 8 dot matrix. The width of such graphics is W dot, and the height is 8 dots. Each column has 8 dots and can be represented by a byte (8 bits). The MSB of the byte corresponds to the uppermost dot of the column. “1” black “0” white.

The data are the bytes of relative columns in the graphics. The number of bytes should equal W.

Example:

To print the special graphics shown below, ESC K command is used. This example is

16×16 dot matrix (16 columns and 16 rows), and should be divided into two parts (upper & lower) for printing. The line spacing should be set 0 by using the command ESC 1 n. So n1=16 and n2=0, that is W=16, for each 8 rows. There are all together 32 bytes of data. The data in hexadecimal are:07, 18, 20, 40, 40, 98, 90, 91, 91, 9E, 40, 40, 20, 18, 07, 00, C0, 30, 08, 04, 04, 72, 92, 12, 12, 32, 04, 04, 08, 30, C0, 00.
notice that if the TP uP-AT is set in non-inverse printing mode by using command ESC c NUL (hexadecimal 1B,63,00), data sequence is shown above, the data is sent beginning from the most upper 8 rows of the graphic. Otherwise in inverse printing, data is sent beginning from the lower 8 rows. Data sequence of this example changes to: C0, 30, 08, 04, 72, 92, 12, 12, 32, 04, 04, 08, 30, C0, 00, 07, 18, 20, 40, 40, 98, 90, 91, 91, 9E, 40, 40, 20, 18, 07, 00.



BASIC program for inverse printing:

```
10 FOR E=1 TO 2
20 RESTORE 120
30 LPRINT CHR$(27); "W";CHR$(E);
                    'enlarge in W & H
40 LPRINT CHR$(27); "1"; CHR$(0);
                     'line spacing=0
50 FOR J=1 TO 2
```



```
60 LPRINT CHR$(27); "K"; CHR$(16); CHR$(0);
                          'ESC K command
70 FOR I=1 TO 16
80 READ D: LPRINT CHR$(D);
                  'enter 16 bytes of data
90 NEXT I: LPRINT    'enter CR
100 NEXT J: LPRINT: LPRINT
110 NEXT E: END
120 DATA &HC0, &H30, &H08, &H04
130 DATA &H04, &H72, &H92, &H12
140 DATA &H12, &H32, &H04, &H04
150 DATA &H08, &H30, &HC0, &H00
160 DATA &H07, &H18, &H20, &H40
170 DATA &H40, &H98, &H90, &H91
180 DATA &H91, &H9E, &H40, &H40
190 DATA &H20, &H18, &H07, &H00
```

Printout on TP uP-AT:

ESC ' print curving graph lines

Format:	ASCII	:	ESC' m n1 n2 ⋯nk CR
	Decimal	:	27 39 m n1 n2 ⋯nk 13
	Hexadecimal	:	1B 27 m n1 n2 ⋯ nk 0D

Explanation:

This command is designed to print curving graph lines along the paper feed (vertically). The value m is the number of lines and should be within the range 1 to the maximum number of dots per line (See Section 1.7)

In a horizontal dot line, there are m intersections of m curving graph lines. The value n1, n2,⋯,nk represent the position of these m intersections. The number of nk must equal m. Each nk must fall within the maximum number of dots per line. The last CR (Carriage Return) lets printed out with respective nk values, m curves will appear in the printout.

Example:

To print out graph lines of the five equations:

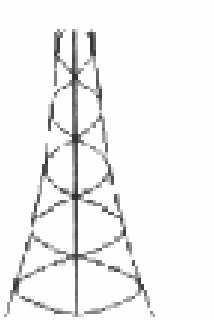
Y1=50+40*EXP(-0.01*X)*SIN(X/10)

```
Y2=50-40*EXP(-0.01*X)*SIN(X/10)
Y3=50
Y4=50+40*EXP(-0.01*X)
Y5=50-40*EXP(-0.01*X)
```

Program with BASIC language as below:

```
10 FOR X=0 TO 150 'print 150 dot lines
20 Y=INT( 40*EXP(-0.01*X))
30 YY=INT (Y*SIN(X/10))
40 LPRINT CHR$(27)CHR$(39)CHR$(5)
                          'ESC' command m=5
50 LPRINT CHR$(50+YY)CHR$(50-YY)CHR$(50);
60 LPRINT CHR$(50+Y)CHR$(50-Y)CHR$(13);
70 NEXT X
```

Printout on TP uP-A:



Initialization commands

ESC @ — Initialize printer

Format:	ASCII	:	ESC	@
	Decimal	:	27	64
	Hexadecimal	:	1B	40

Explanation:
Reset printer to:
*clear print buffer

*restore default values
*select Font 1
*de-select user-defined characters

Data control commands

CR — Carriage Return

Format:	ASCII	:	CR
	Decimal	:	13
	Hexadecimal	:	0D

Explanation:
When a Carriage Return is sent to the printer, any data in the buffer is printed and paper is fed one line.

CAN — Cancel line

Format:	ASCII	:	CAN
	Decimal	:	24
	Hexadecimal	:	18

Explanation:
This command cancels all text in the print buffer preceding this code back to the previous Carriage Return. It does not cancel any control code sequences issued in that line.

DEL — Delete character

Format:	ASCII	:	DEL
	Decimal	:	127
	Hexadecimal	:	7F

Explanation:
The previous character in the buffer is deleted unless that character has already been printed. This command will not remove control codes.

NUL — Null

Format:	ASCII	:	NUL
	Decimal	:	0
	Hexadecimal	:	00

Explanation:
NUL is used as the final code in some commands such as ESC B, ESC D and ESC %. NUL command is ignored by printer when used alone.

Hexadecimal Dump Printing Command

ESC ”			Turn Hexadecimal Dump Printing on/off
Format:	ASCII	:	ESC ” n
	Decimal	:	27 34 n
	Hexadecimal	:	1B 22 n

Explanation:
Hexadecimal Dump print mode is turned on if n=1, and turned off if n=0. If you execute programs or list program in Hexadecimal Dump print mode, all data sent from the host computer will be printed out in hexadecimal.

Example:
When the following 4 data are sent from the host computer after the command ESC ”.
10 LPRINT CHR$(27);CHR$(34);CHR$(1);
20 LPRINT CHR$(0);CHR$(27);“A”;CHR$(24);
The printout reads:
00 1B 41 18
Printing in the Hexadecimal Dump mode is performed only when the printer is in the buffer-full state.

Chapter 4 Daily maintenance

Replace ribbon cassette

It needs to replace when the print out is too weak.

The models of the ribbon cassette used by the TPUP-AT series are shown as bellow:

TPUP-AT16: EPSON ERC-05
TPUP-AT40: EPSON ERC-09
TPUP-AT24: EPSON ERC-09 or ERC-22

If it is needed to replace the ribbon cassette, refer to “install the ribbon cassette” in chapter 1.

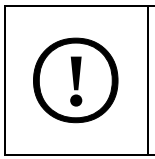
Troubleshooting

The printer can’t print

- Make sure the printer is connected to the power supply properly.
- The indicator is whether light or not and make sure the printer is online.
- Make sure the printer is connected to the computer properly.
  Try to use the self-test if the printer still can not print.
- If the self-test list is correct, the malfunction may be caused by the computer, software or the interface cable.
- Contact the vender if the self-test is abnormal.

Print out is unclear or asymmetric

- Check whether the ribbon cassette is installed correctly or not. (Refer to the chapter 1.)
- The ribbon cassette may be too old, replace it with a new one.
- If the print out is fragmentary, the printer head error may happen. Please contact your vender.



Don’t try to replace the printer head by yourself.

Printer stop printing

- It may run out of the paper.
- Paper jam may occur.
- Maybe the ribbon is jammed.

The indicator turn red

- It indicates no paper. It is needed to replace a new paper scroll. (Refer to the chapter 1)

	Don't connect to the power supply if leave the printer unused for a long time. Check whether wastepaper is stick to the mechanism head or nor if so clean it when you replace the paper scroll. Disconnect the power supply if the printer works abnormally.

	Don't press the ribbon cassette too strongly when replace it. Because it will cause damage easily.
	Don't add the lube to the mechanism head.
	Contact your vender if there is abnormity. Never pull out the CMOS chip.
	Don't add the ink to the ribbon or will cause damage.
	Use the power supply specified or it will do harm to the printer.

Chapter 5 Specifications

- Printing method: directed impact dot matrix
- Printing mechanism: 4/6 pin shuttle
- Design specially for install in the vertical panel of the apparatus or devices.
- It is easy to control with 36 compatible ESC commands or 16 TPUP-16/TPUP-40 printing commands.
- Character sets: 2 ASCII character sets, 448 characters total, and 32 user-defined characters.
- Level one, level two Chinese characters (GB 2312—1980), 6763 Chinese characters total.
  Characters size: (standard) 5×7
  Bit-map graphics: 6×8
  User-defined characters: 6×8
  Chinese characters: 12×12 or 15×16
- Line space: 1~255 dot lines
- Interface: 8 bit parallel interface
- Interface port: 26 PIN flat plug
- Control commands: 36 compatible ESC commands, or 16 TPUP-16/TPUP-40 control commands. (Only TPUP-AT16 and TPUP-AT40).
- Buffer: 30.5K bytes
- Button SEL：Select the online/offline state
- Button LF: feeding paper
- Indicator: green——online
  red ——offline no paper
  orange——online no paper
  off —— offline

Model and its parameters

Model	Characters/line (5×7)	Character size (mm)	Density (dots/line)	Speed (lines/second)
UP-AT16	16	1.8×2.5	96	1.0
UP-AT24	24	1.7×2.4	144	1.7
UP-AT40	40	1.1×2.4	240	0.4

Paper scroll

Paper width： 44.5±0.5mm(only TPUP-AT16)
57.5±0.5 mm(except TPUP-AT16)
Paper thickness: 53～64g/m^2
Outside diameter: 40mm(max)
Inside diameter: 8.5mm (min)

Ribbon cassette

TPUP-AT16: EPSON ERC-05
TPUP-AT40: EPSON ERC-09
TPUP-AT24: EPSON ERC-09 or ERC-22

Overall dimension

112mm(w)×65mm(h)×88mm(d)
Weight about 350g(exclude the paper scroll)

Power supply

DC 5V±5%, average current 2.0A, peak value 3A

Under condition

Temperature 0~40℃
Relative humidity 0~80%

Chapter 6 Parts list

1. Connected cable
2. Fastness frame
3. Screws(Φ3×25㎜, four)
4. Manual
5. Power supply cable
6. Paper scroll

Appendix 1 The valid character codes

The number of the valid character codes is from 00H to 0FFH. The section ooH~1FH is used for command codes, the section 20H~0FFH is used for character codes. The character codes are made up of two character sets. Each character set is from 20H to 0FFH.

Appendix 2 Printing command codes

Decimal	Hexadecimal	Format	Function
0	00	NUL	Sign of end
9	09	HT	Execute the horizontal tab
10	0A	LF	Line feed
11	0B	VT	Execute the vertical tab
12	0C	FF	Form feed
13	0D	CR	Carriage return
14	0E	SO	Select double-width printing
20	14	DC4	Cancel double-width printing
24	18	CAN	Cancel line
27 34	1B 22	ESC " n	Turn Hexadecimal Dump Printing on/off
27 37	1B 25	ESC % m1 n1 ... mk nk NUL	Replace with user-defined character
27 38	1B 26	ESC & m n1 n2 ... n6	Define user-defined characters
27 39	1B 27	ESC ' m n1 n2 ... nk CR	Print curving graph lines
27 43	1B 2B	ESC + n	Turn overscore on/off
27 45	1B 2D	ESC – n	Turn underline on/off
27 49	1B 31	ESC 1 n	Set ‘n’ dot lines spacing
27 54	1B 36	ESC 6	Select Font 1
27 55	1B 37	ESC 7	Select Font 2
27 58	1B 3A	ESC :	Restore the font character
27 64	1B 40	ESC @	Initialize printer
27 66	1B 42	ESC B n1 ... nk NUL	Set vertical tabs
27 67	1B 43	ESC C n	Set page length
27 68	1B 44	ESC D n1 ... nk NUL	Set horizontal tabs
27 74	1B 4A	ESC J n	Print and ’n’ dot lines feed

Decimal	Hexadecimal	Format	Function
27 75	1B 4B	ESC K n1 n2 .. data ...	Bit map printing
27 78	1B 4E	ESC N n	Set bottom margin
27 79	1B 4F	ESC O	Cancel bottom margin
27 81	1B 51	ESC Q n	Set right margin
27 85	1B 55	ESC U n	Enlarge width
27 86	1B 56	ESC V n	Enlarge height
27 87	1B 57	ESC W n	Enlarge width & height
27 99	1B 63	ESC c n	Turn inverse printing on/off
27 102	1B 66	ESC f m n	Print blank character or lines
27 105	1B 69	ESC i n	Turn reverse printing on/off
27 108	1B 6C	ESC l n	Set left margin
28 14	1C 0E	FS SO	Select double-width printing
28 20	1C 14	FS DC4	Cancel double-width printing
28 33	1C 21	FS ! n	Select character set
28 38	1C 26	FS &	Enter Chinese characters printing mode
28 46	1C 2E	FS •	Exit Chinese characters printing mode
127	7F	DEL	Delete the last character

Appendix 3 mini printer commands of TPμP-16 and TPμP-40

1、TPμP-16 command codes

Command codes		Format	Explanation
Hexadecimal	Decimal	Hexadecimal	
#00	0	00 n	Select character set 1 or 2; n=01, 02
01	1	01	Print all the user-defined characters
02	2	02	Print 2 blank
03	3	03	Print 3 blank
04	4	04	Print 4 blank
05	5	05	Print 5 blank
06	6	06 m n1，n2 …n6 0D	Define the character code ‘m’ by n1～n6，0D indicate the end
07	7	07 m n1，n2 …nm, 0D	Print m curving graph lines in the position n1～nm
08	8	08	Select the list printing mode
09	9	09 n	Define the line length to n dots
0A	10	0A	
0B	11	0B	Carriage return
0C	12	0C	Print 11 blank
0D	13	0D	Print 12 blank
0E	14	0E n	Carriage return/end the command
0F	15	0F m n1，n2 …nm, 0D	Print the character before 0E n times print the bit map with the data n1～nm

Remark#:00 commands is newly increased commands.

2、TPμP-40 command codes

Command codes		Format	Explanation
Hexadecimal	Decimal	Hexadecimal	
#00	0	00 n	Select character set n; n=01, 02
01	1	01 n	Enlarge width n times, n=1～4
02	2	02 n	Enlarge height n times, n=1～4
03	3	03 n	Enlarge width & height n times, n=1～4
04	4	04 n	Define the line length to n dots
05	5	05 m n1, n2 …n6	Define the character code ‘m’ by n1～n6
06	6	06 m n 0D	Replace the character ‘n’ with the user-defined character ‘n’
07	7	07	Feed paper to next horizontal tab
08	8	08 n	Vertical tab jumps n lines
09	9	09	Restore the font character and clean the buffer
0A	10	0A	Issue the blank character code 20H then carriage retune
0B	11	0B	Invalid
0C	12	0C	Invalid
0D	13	0D	Carriage return/06 end command
0E	14	0E m n	Print character ‘m’ n times
0F	15	0F m n1, n2 …nm	print the bit map with the data n1～nm

2002.03